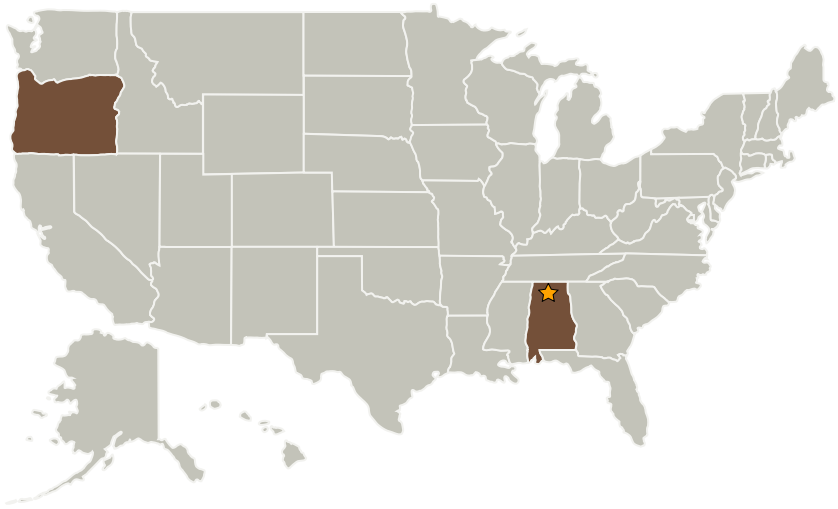
New Class of Multi-Channel Spectrometers Based on Diffraction Grating Array, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Remote chemical analysis via spectroscopy is an important tool in the arsenal or Earth and Planetary Science. Grating technology, which is the centerpiece of most modern spectroscopy systems, has not change significantly in the last 60 years since introduction of holographic gratings. Recently LightSmyth introduced new technology for design and fabrication of diffraction grating elements based on projection photolithography using state-of-the-art semiconductor industry tools. This opened a pathway for very powerful grating elements enabling new class of spectroscopy instruments. LightSmyth Technologies proposes to utilize its recently introduced innovative Diffraction Grating Array to demonstrate robust ultra-compact multi-channel spectrometer with athermal stress-proof self-calibration suitable for deployment at the orbit as well as UAV, USV and UUV platforms. The main advantages of the instrument is up to 100 times improvement in diffraction efficiency, low mass, small footprint, absence of moving parts, robustness, wide spectral range coverage with high resolution and athermal self-calibration for accurate determination of absolute spectrum wavelengths.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
LightSmyth Technologies	Supporting Organization	Industry	Eugene, Oregon

Primary U.S. Work Locations	
Alabama	Oregon

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Thomas Mossberg

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes